Virtual Wide Area Networks (VWANs) for Public Safety

How VWANs Can Make First Responders Safer

Presentation for FCC Public Safety and Homeland Security Bureau
by Layer 2 Connections, LLC

January 27, 2011

Objectives and Agenda

Agenda

- Introductions
- Setting the stage – Our Goals
- Technical Challenges
- Demonstration 1: Seamless Handoff
- Demonstration 2: Network Bonding
- Demonstration 3: Interoperability
- What is a VWAN?
- Open Discussion, Next Steps

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Our Goals Today

- Introduce a technology framework that promotes interoperability, while maintaining maximum freedom of choice for policy makers and public safety end users
- Solicit counsel from the PSHSB about how VWANs might support policies to ensure nationwide interoperability and improve safety for first responders

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Technical Challenges

- Insufficient and unreliable mobile bandwidth for video/VoIP.
  - Low bandwidth situations – need to boost bandwidth to support critical applications
  - Regular bandwidth situations – need resilience for out of coverage challenges
  - Congestion situations – need ability to just get through
- Security of paramount concern.
- Quality of Experience is a challenge.
- High cost of reliable and adequate wired and wireless bandwidth.
- Need for “always on” connectivity.
- National Broadband Plan driving requirements for Nationwide Interoperability for first responders.

VWANs apply to current FCC recommendations

"Unfortunately, America will inevitably face not just day-to-day public safety needs but the needs caused by occasional major disasters, and accordingly the public safety network must be able to expand its capacity to deal with extreme circumstances.

For that reason, ***the FCC recommended that public safety be able to roam over to commercial networks*** *with priority access to provide as much as 60 additional megahertz of spectrum. This concept has the additional advantage of providing two or more back-up networks, and therefore much more resiliency and redundancy than we currently have."*

SOURCE: CHIEF JAMES BARNETT STATEMENT TO SENATE COMMITTEE ON COMMERCE, SCIENCE AND TRANSPORTATION ON 9.23.10

VWANs also apply to current PSCR requirements

700 MHz Seamless Roaming Requirements

Title: Interop 4 - Inter-RAT

- **Requirement:** PSCR Requirement
- **Configuration:** Basic configuration + Requires multi-mode UEs, and access to non-LTE network
- **Purpose:** To demonstrate a UE can roam from/to a non-LTE network to an LTE network.

SOURCE: Public Safety Communications Research, NIST Aug 23, 2010

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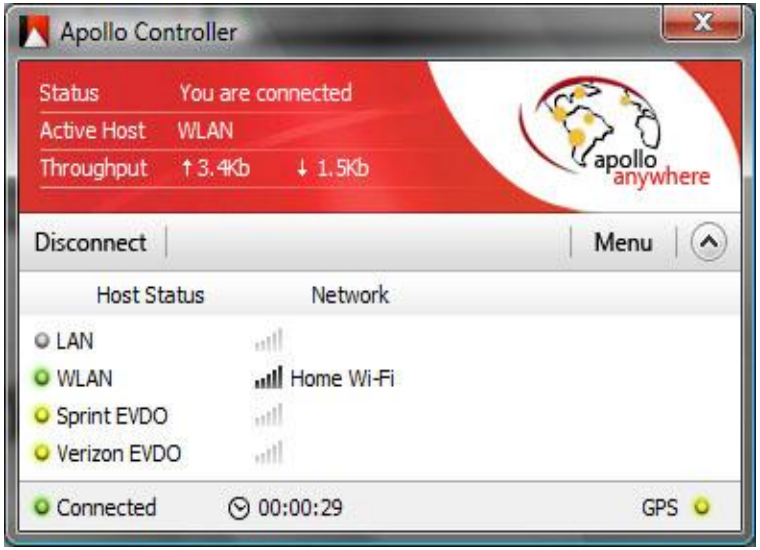

DEMONSTRATION 1: SEAMLESS HANDOFF

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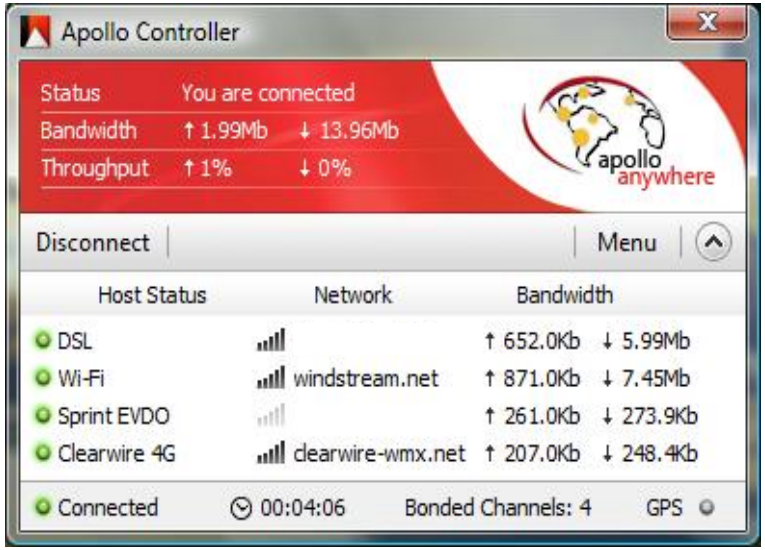

DEMONSTRATION 2: NETWORK BONDING

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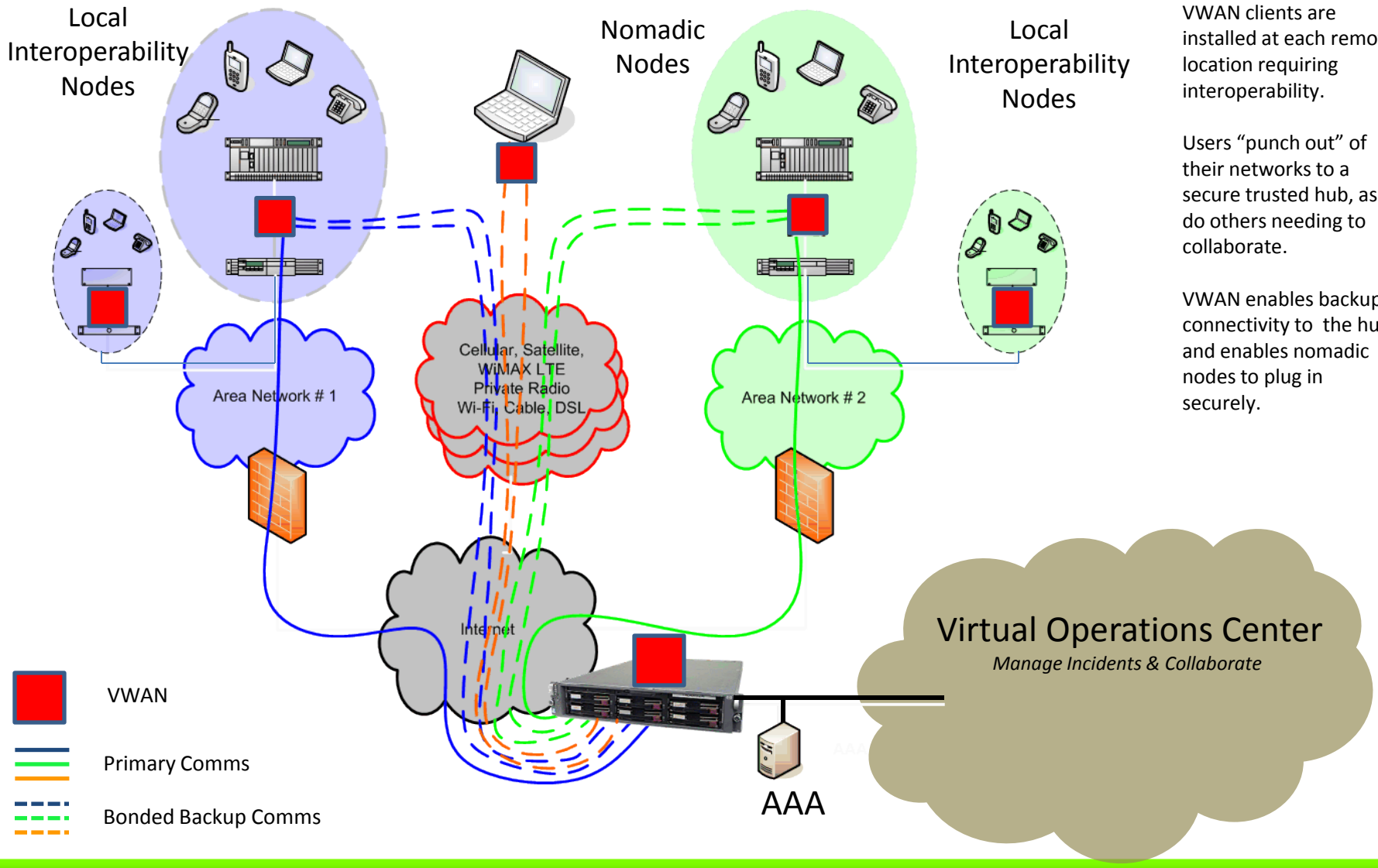
Use Case: Improving First Responder Safety During Mutual Aid Situations



VWAN clients are installed at each remote location requiring interoperability.

Users "punch out" of their networks to a secure trusted hub, as do others needing to collaborate.

VWAN enables backup connectivity to the hub and enables nomadic nodes to plug in securely.

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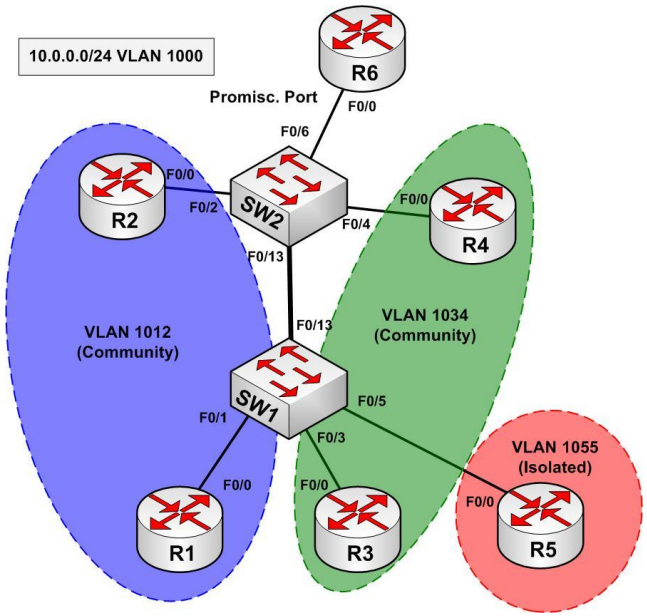

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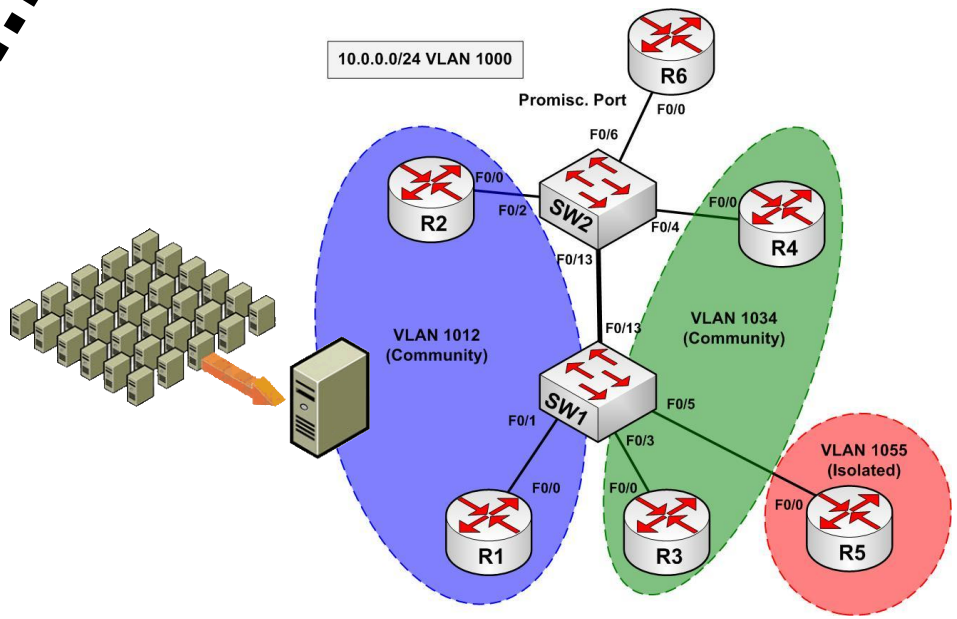

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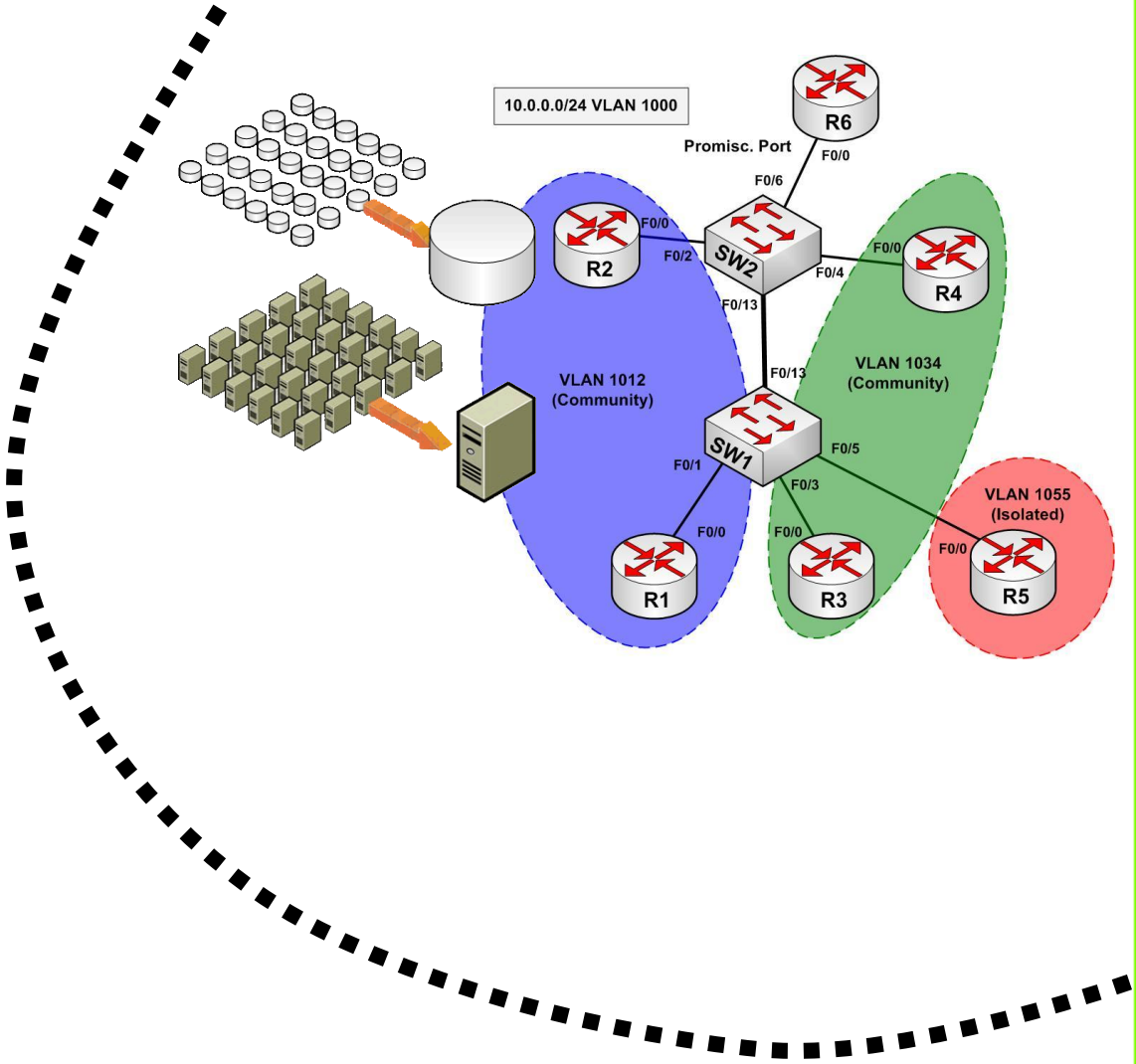

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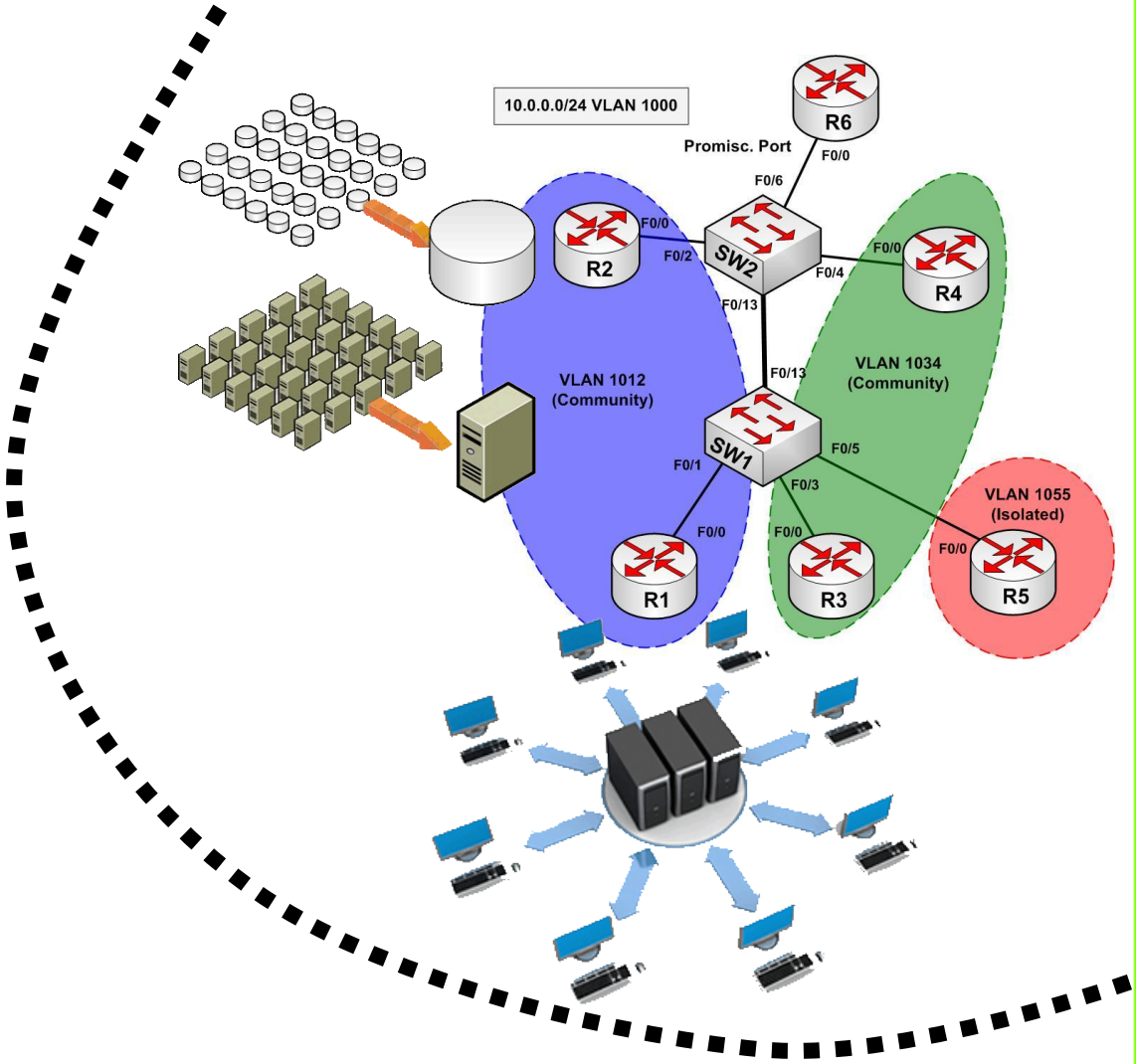

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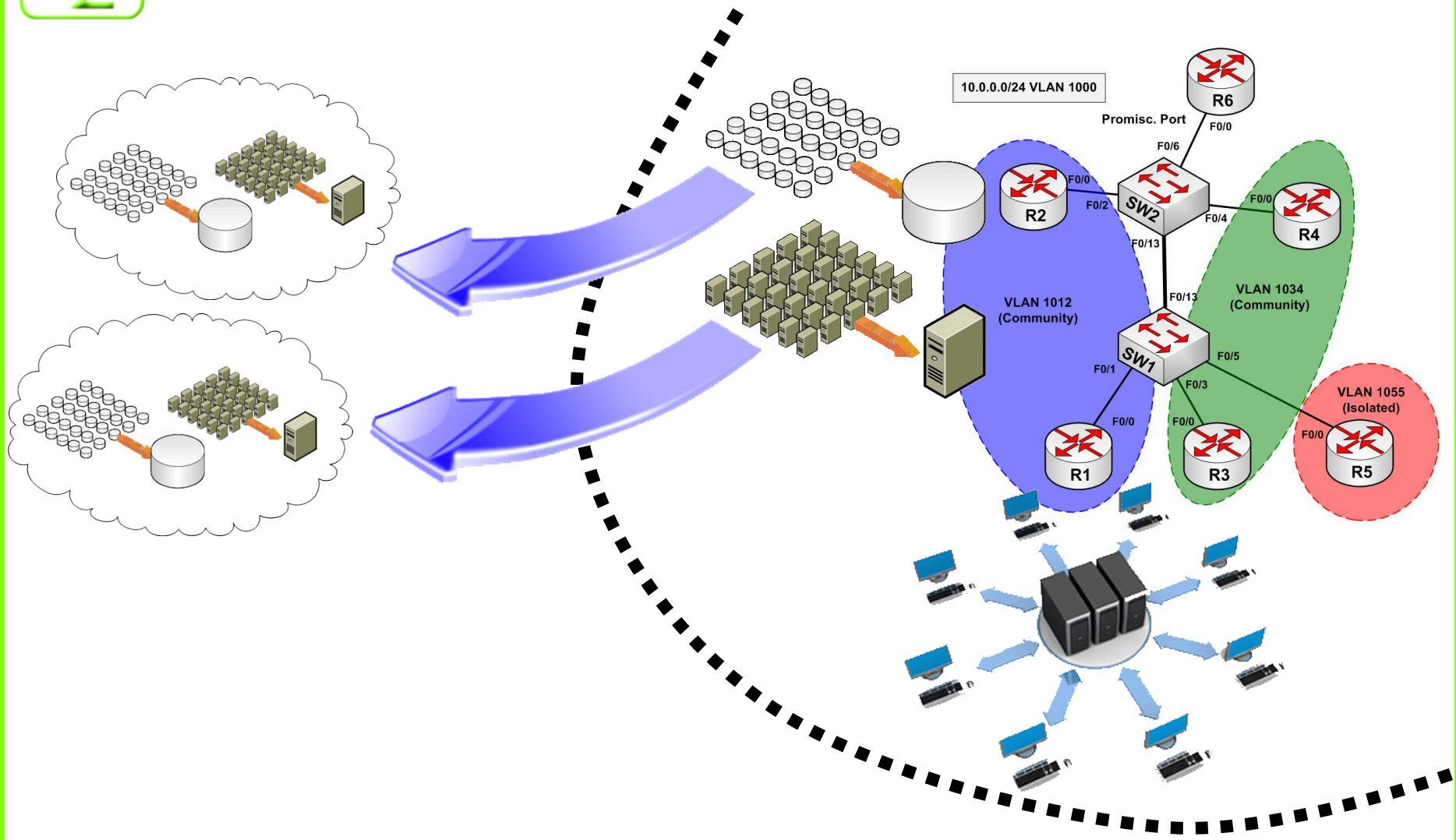

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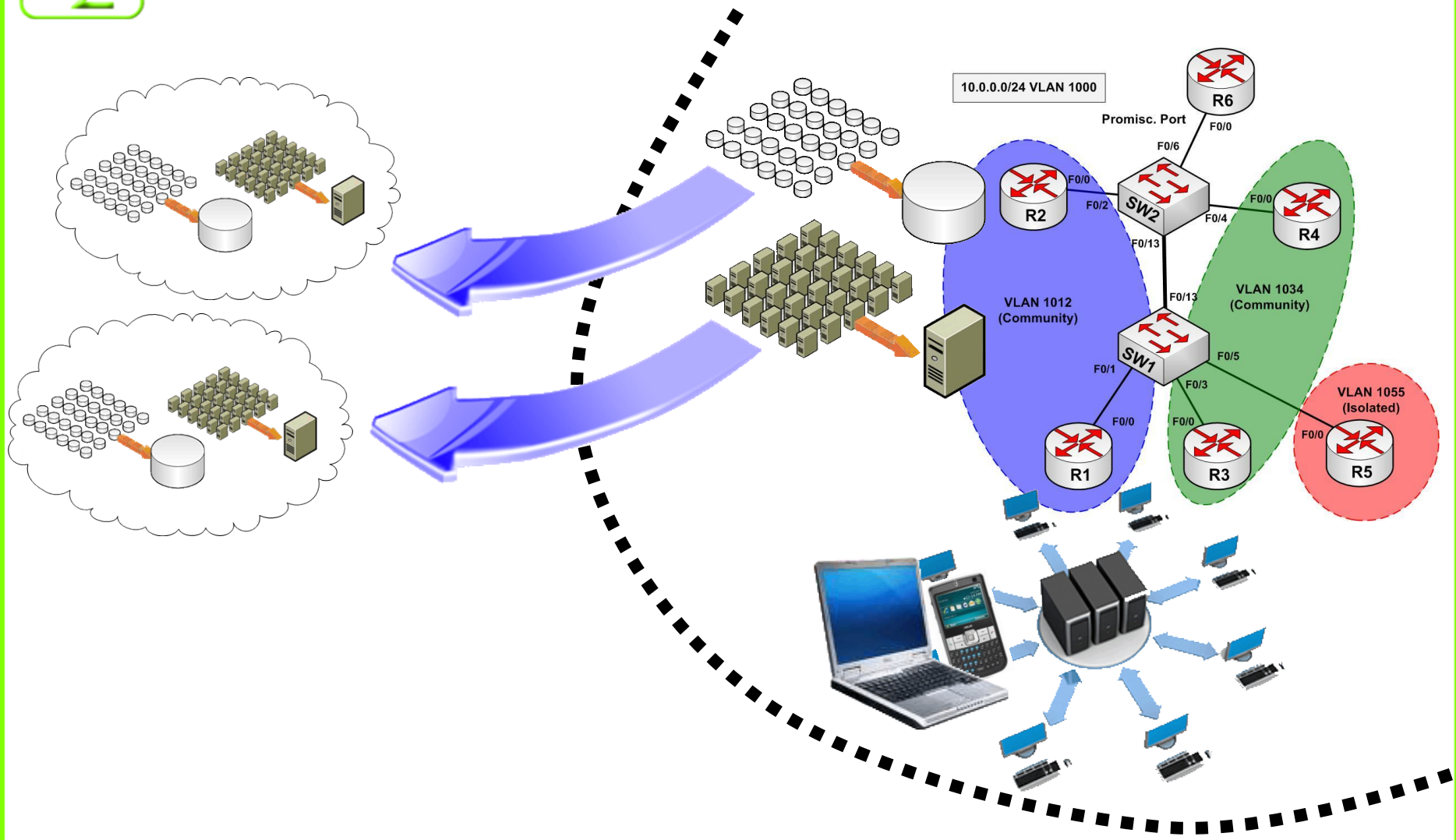

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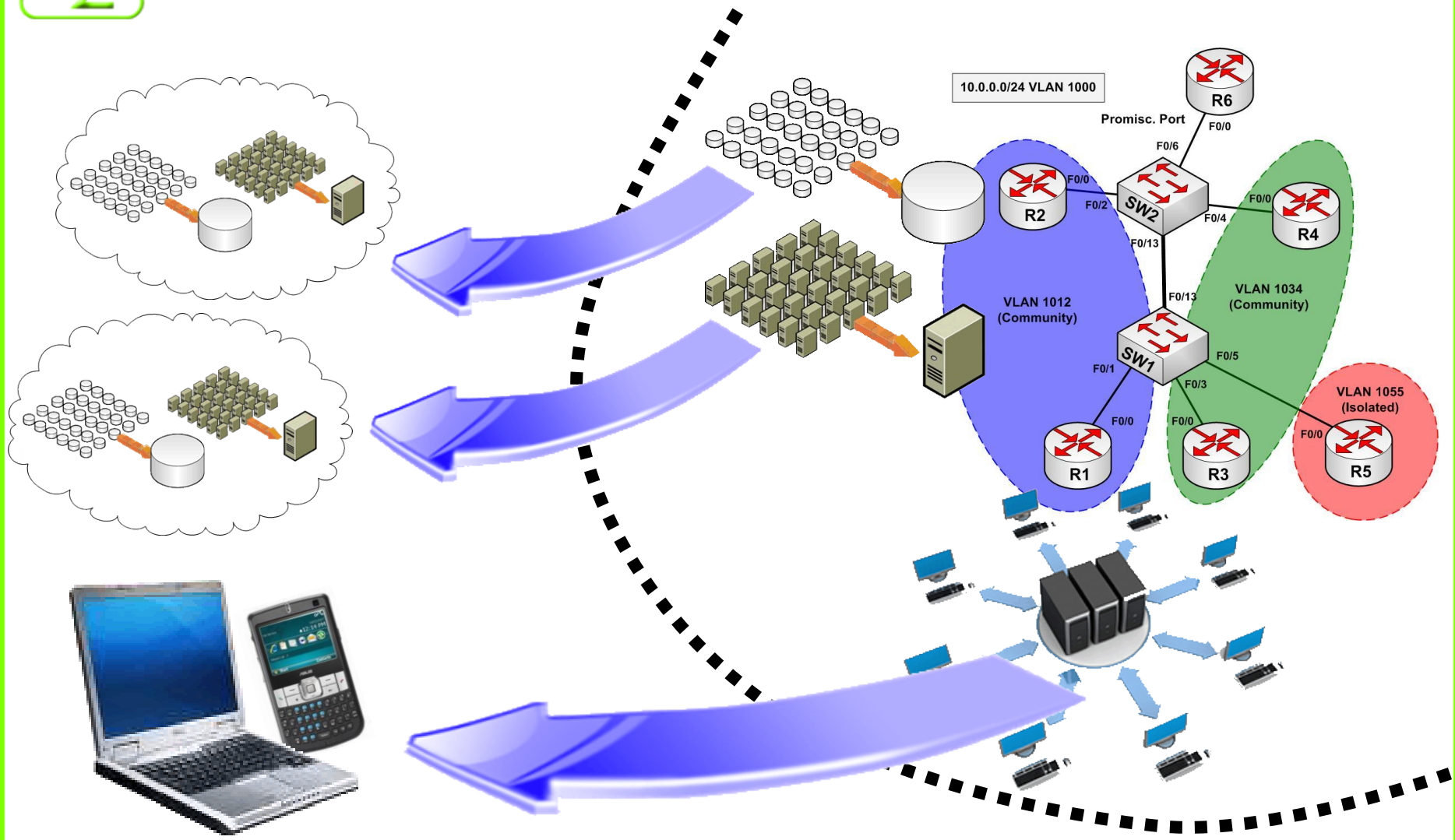

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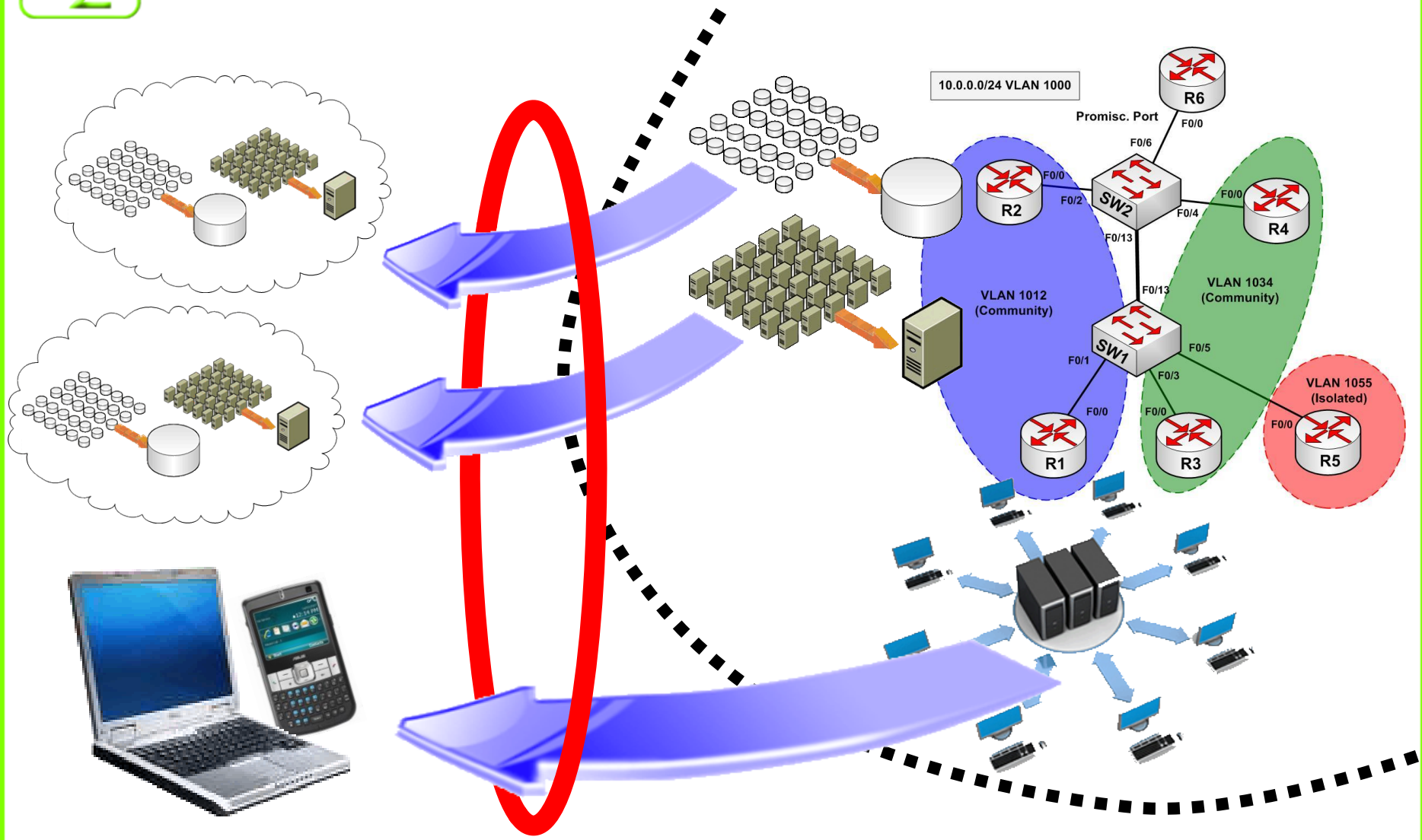

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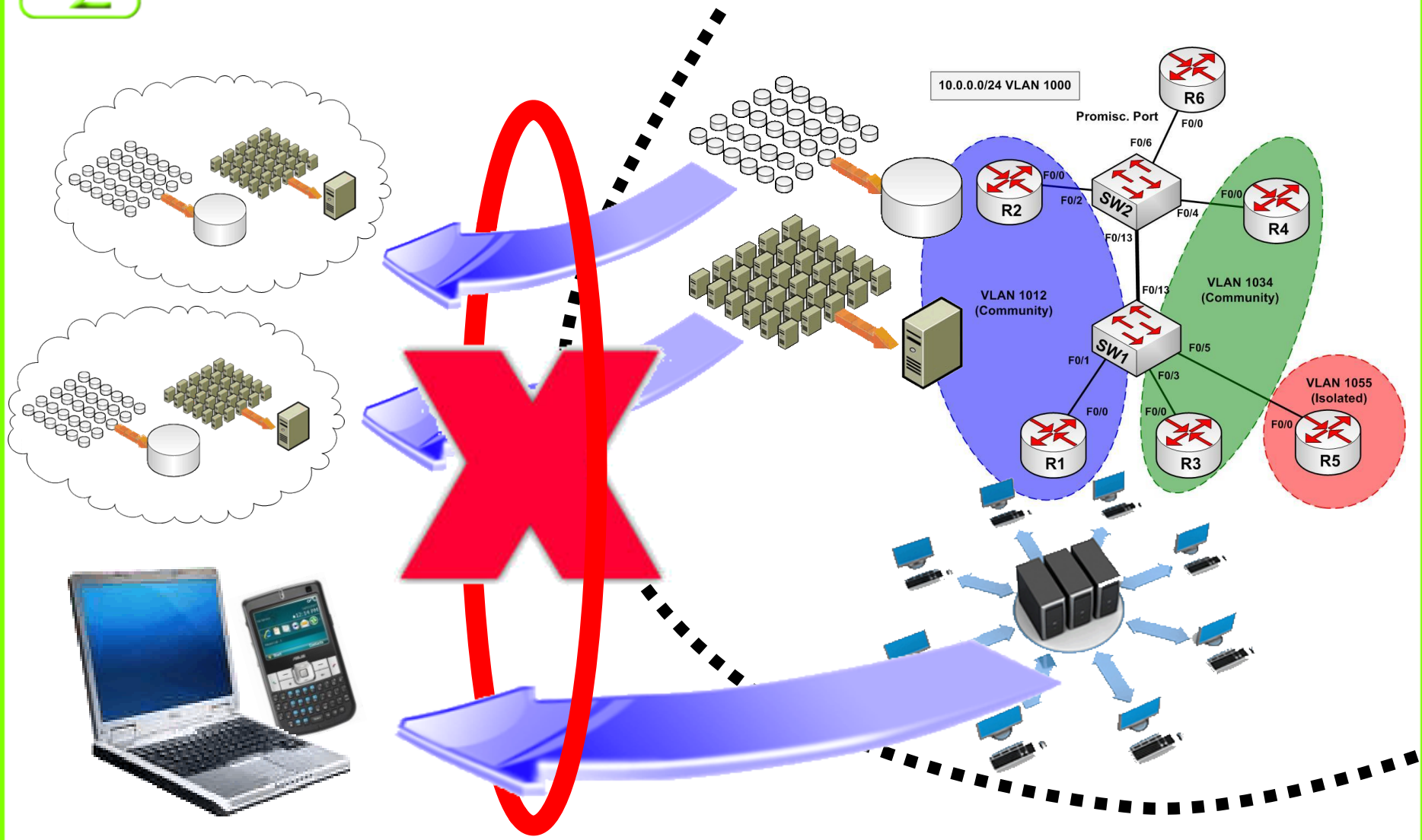
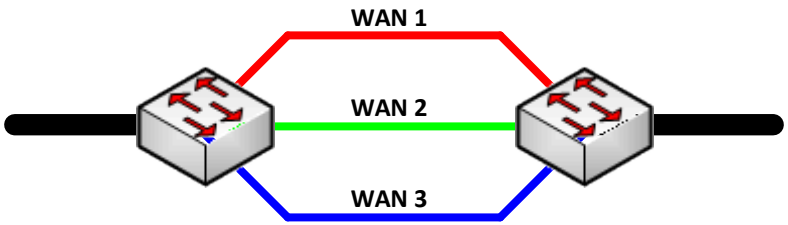


Compare VWAN to VLAN

Layer 2 VWAN



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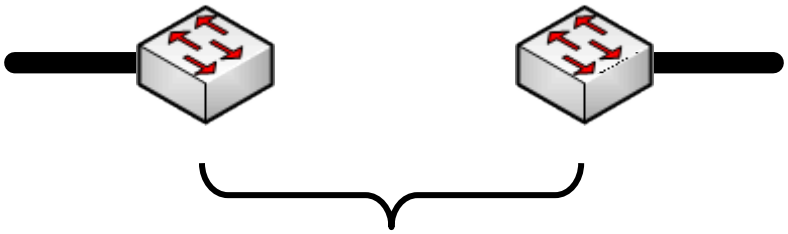
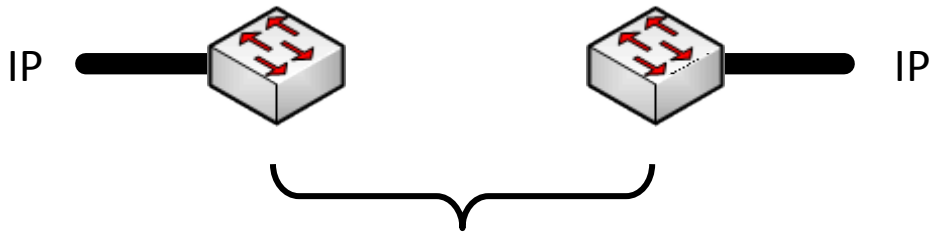


Layer 2 Tunneling Protocol

Layer 2 VWAN



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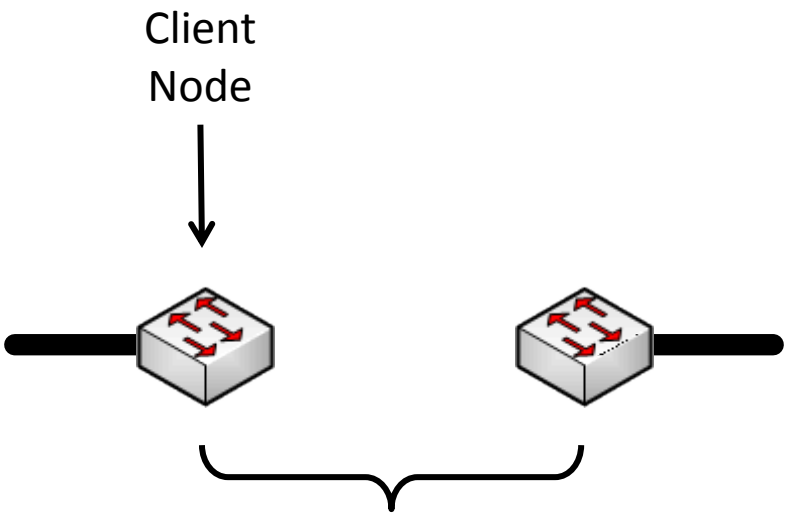

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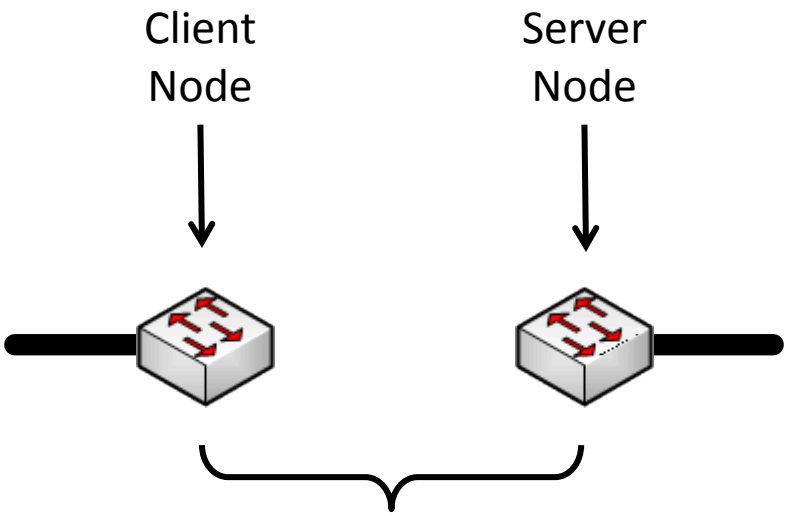

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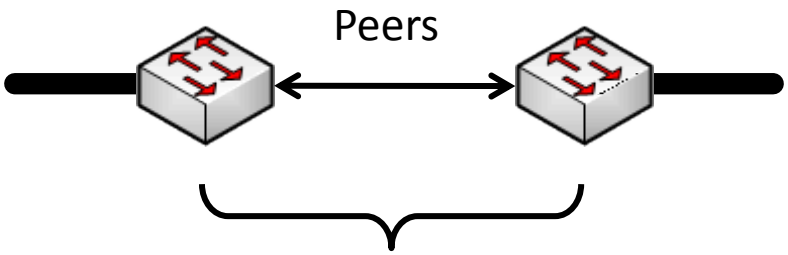

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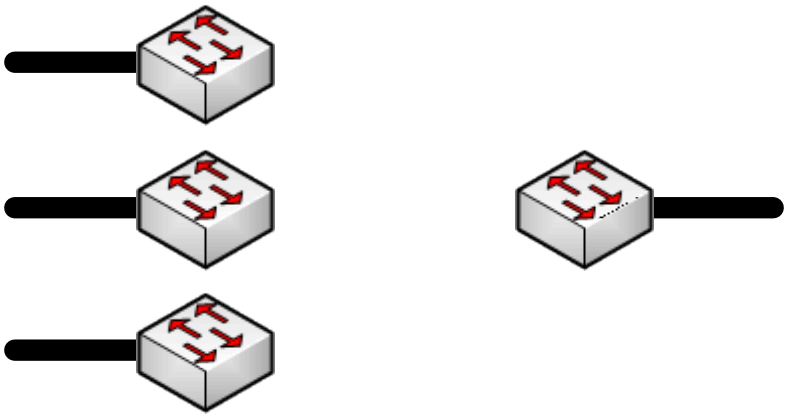
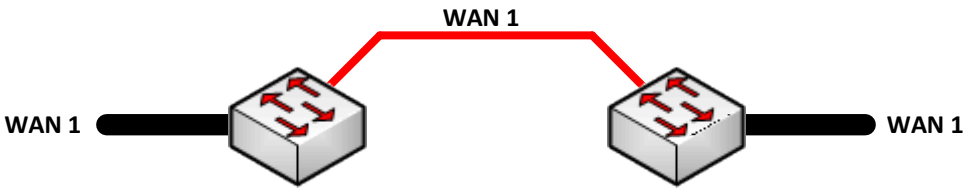


WAN Bonding



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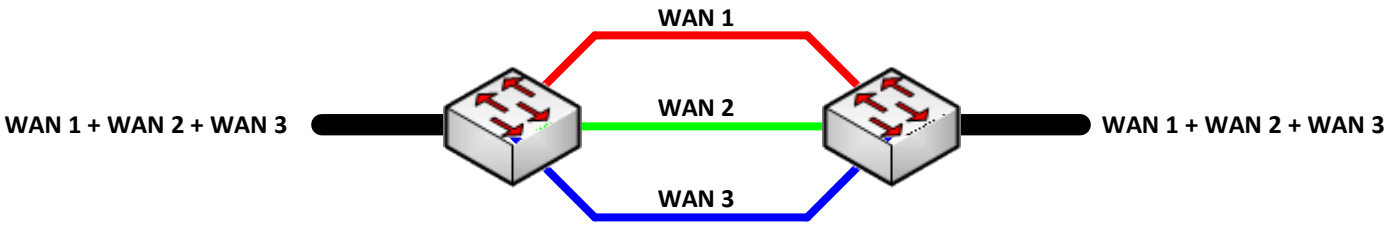

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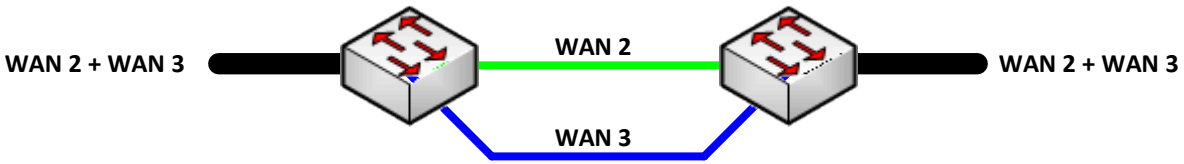
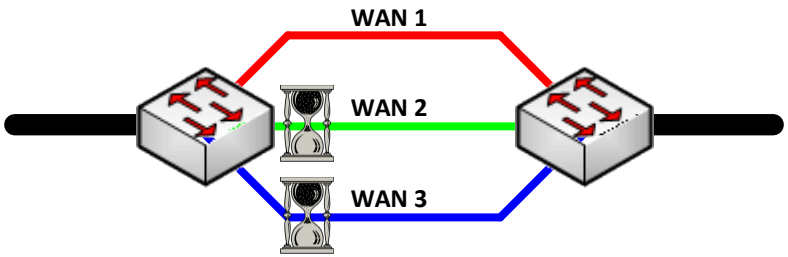


VWAN Roaming



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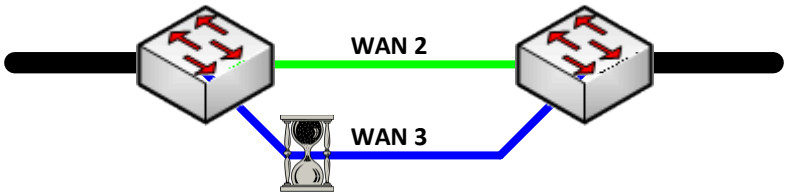

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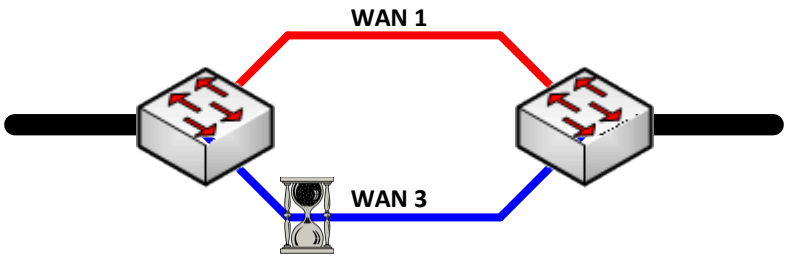

WAN Disconnect

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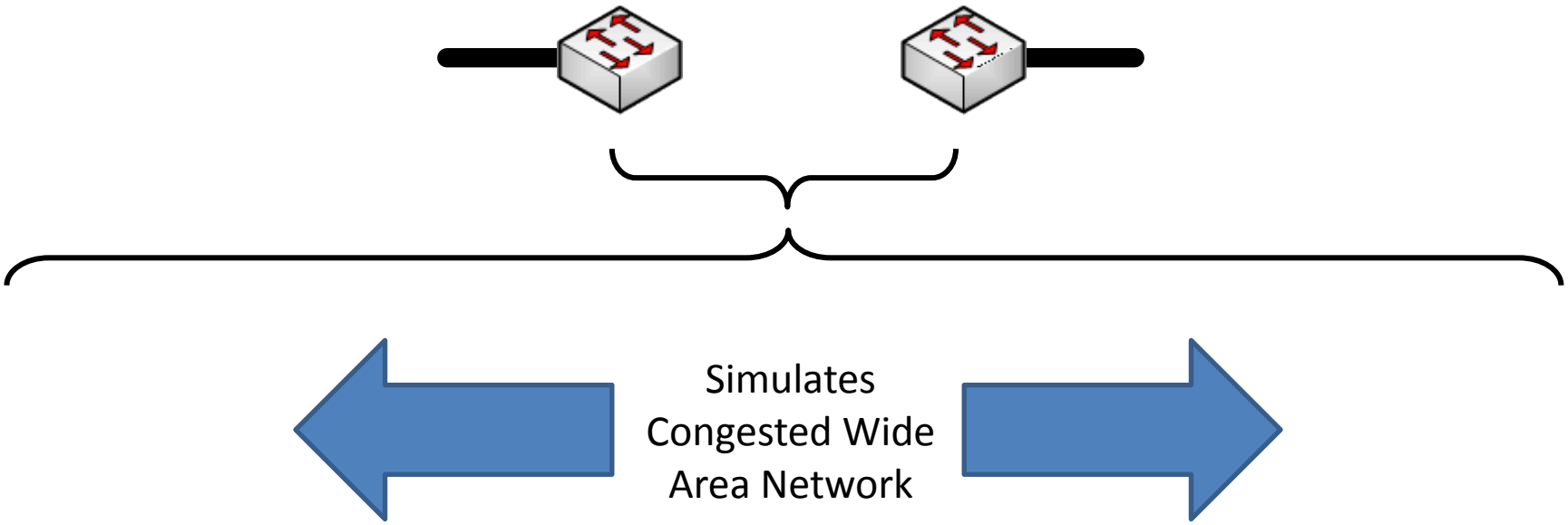

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Summary

- Efforts to provide first responders with improved broadband will benefit from recognizing there is often sufficient broadband available but insufficient *access* to it.

- Virtual Wide Area Networks (VWANs) make multiple similar and/or dissimilar WAN networks act and behave as one.

- VWANs can improve the safety and productivity of first responders by:
  - Offering resilience in connection, enabling “make-before-break” seamless handoff of a data session across similar and/or dissimilar networks;
  - Aggregating the bandwidth of multiple connections to improve situational awareness, and;
  - Enabling interoperability across multiple jurisdictions.

OPEN DISCUSSION

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